

Table 1: Dissolved Gas Monitoring Network

Station Owners, Collection Methods and Transmission Systems					
Station Code	Station Location	Station Owner	TDG Meter	Data Collection System	Telemetry Pathway
1 CIBW*	US/Can Boundary	BOR	CSI/TBO-F	Sutron 8004	GOES to CAFÉ plus GOES to BOR downlink
2 FDRW	GCL Forebay	BOR	CSI	Sutron 8200	GOES to CAFÉ plus GOES to BOR downlink
3 GCGW	GCL Tailwater	BOR	CSI/TBO-F	Sutron 8004	GOES to CAFÉ plus GOES to BOR downlink
4 LIBM	LIB Tailwater	NWS	CSI	Synergetics	Radio to LIB PC to NWS Mainframe to CAFÉ over LAN
5 CHJ	CHJ Forebay	NWS	CSI/TBO-F	Sutron 8200	GOES to CAFÉ
6 CHQW	CHJ Tailwater	NWS	CSI	Geomation	Radio to CHJ PC to NWS Mainframe To CAFÉ over LAN
7 WEL	WEL Forebay	Douglas	Sweeney Saturometer/to HydroLab 4/30/97	Manual Collection/ Transmission	To CAFÉ through CBT
8 RRH	RRH Forebay	Chelan	CSI/TBO-F	None	Radio to RRH PC to PUD to CAFÉ through CBT
9 RRDW	RRH Tailwater	Chelan	Hydrolab	None	Radio to RRH PC to PUD to CAFÉ through CBT
10 RIS	RIS Forebay	Chelan	CSI/TBO-F	None	Radio to RRH PC to PUD to CAFÉ through CBT
11 RIGW	RIS Tailwater	Chelan	Hydrolab	None	Radio to RRH PC to PUD to CAFÉ through CBT
12 WAN	WAN Forebay	Grant	CSI	Sutron	GOES to CAFÉ
13 WANW	WAN Tailwater	Grant	CSI	Sutron	GOES to CAFÉ
14 PRD	PRD Forebay	Grant	CSI	Sutron	GOES to CAFÉ
15 PRXW	PRD Tailwater	Grant	CSI	Sutron	GOES to CAFÉ
16 DWQI*	DWR Tailwater	NWW	CSI/to HydroLab Wk of 3/24/97	Zeno 3200	Phone Lines to DWR PC to NWW Mainframe to CAFÉ over LAN
17 PEKI	Peck	NWW	CSI/to HydroLab Wk of 3/24/97	Zeno 3200	Phone Line to DWR PC to NWW Mainframe to CAFÉ over LAN
18 LEWI	Lewiston	NWW	CSI/to HydroLab Wk of 3/24/97	Zeno 3200	Radio to phone line to Clarkston PC to NWW Mainframe to CAFÉ over LAN
19 LWG*	LWG Forebay	NWW	CSI	Zeno 3200	Radio to LWG PC to NWW Mainframe to CAFÉ over LAN
20 LGNW	LGNW TW	NWW	CSI/to HydroLab 8/8/97	Zeno 3200	Radio to LWG PC to NWW Mainframe to CAFÉ over LAN
21 LGS	LGS Forebay	NWW	CSI/to HydroLab 5/8/97	Zeno 3200	Radio to LGS PC to NWW Mainframe to CAFÉ over LAN
22 LGSW	LGS Tailwater	NWW	CSI/to HydroLab 8/12/97	Zeno 3200	Radio to LGS PC to NWW Mainframe to CAFÉ over LAN
23 LMN	LMN Forebay	NWW	CSI/to HydroLab 4/30/97	Zeno 3200	Short haul modem to LMN PC to NWW Mainframe to CAFÉ over LAN

					LAN
26 IDSW	IHR Tailwater	NWW	CSI/to HydroLab 4/1/97 by 1700	Zeno 3200	Radio to IHR PC to NWW Mainframe to CAFÉ over LAN
27 MCQW*	MCN FB/Wa	NWW	CSI/to HydroLab Wk of 3/24/97	Zeno 3200	Radio to MCN PC to NWW Mainframe to CAFÉ over LAN
28 MCQO*	MCN FB/Or	NWW	CSI/to HydroLab Wk of 3/24/97	Zeno 3200	Radio to MCN PC to NWW Mainframe to CAFÉ over LAN
29 MCPW*	MCN Tailwater	NWW	CSI/to HydroLab Wk of 3/24/97	Zeno 3200	Radio to MCN PC to NWW Mainframe to CAFÉ over LAN
30 JDA	JDA Forebay	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
31 JHAW	JDA Tailwater	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
32 TDA	TDA Forebay	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
33 TDDO	TDA Tailwater	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
34 BON*	BON Forebay	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
35 WRNO*	Warrendale	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
36 SKAW	Skamania	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
37 CWMW	Camas	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
38 KLAW	Kalama	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ
39 WANO	Wauna Mill	NWP	TBO-L	Sutron 8200	To ADAPS then USGS and To GOES then CAFÉ

NOTES:

1997 TDG Monitoring Season extended from approximately 15 March through 15 September, 1997

* Winter Monitoring Stations: stations where involuntary spill likely to occur over winter. Data collected between 15 September, 1996 and approximately 15 March, 1997. Some data collected for other stations as well.

TBO-L = Common Sensing meter with access to calibration pods underneath casing.

TBO-O = Common Sensing meter with access to calibration pods on front panel of casing

TBO-F = Common Sensing meter with field case

BOR = Bureau of Reclamation; NWS=Seattle District; NWW=Walla Walla District; NWP=Portland District

GOES = Geosynchronous Operational Environmental Satellite

Table 2: 1997 Spill Summary (1997 Daily Averages)

Projects	LWG	LGS	LMN	IHR	MCN	JDA	TDA	BON
<i>Spring</i>	4/10-6/20	4/10-6/20	4/10-6/20	4/10-6/20	4/20-6/30	4/20-6/30	4/20-6/30	4/20-6/30
Ave Outflow (kcfs)	162.53	156.63	168.12	161.72	454.83	478.5	463.47	462.07
Spill Days	72	72	72	72	72	72	72	72
Ave Spill (kcdf)	58.96	60.22	64.53	92.89	289.41	161.47	298.38	254.07
% Spill	36.28	38.45	38.39	57.44	63.63	33.74	64.38	54.99
Spill days > 120%								
Spill Cap	50	49	57	68	71	68	48	70
<i>Summer</i>	6/21-8/31	6/21-8/31	6/21-8/31	6/21-8/31	7/1-8/31	7/1-8/31	7/1-8/31	7/1-8/31
Ave Outflow (kcfs)	66.32	65.39	70.19	72.34	236.51	239.39	230.7	240.09
Spill Days	37	13	18	72	62	62	62	62
Ave Spill (kcdf)	4.54	3.53	3.87	40.62	77.88	46.11	146.82	100.32
% Spill	6.84	5.4	5.51	56.15	32.93	19.26	63.64	41.78
Spill days > 120%								
Spill Cap	3	1	3	13	0	1	0	

Note:

Table 3: 1997 Monthly Average TDG (%)

Stations	APR	MAY	JUN	JUL	AUG	SEP
CIBW	118.2	128.5	130.0	124.8	122.4	119.1
FDRW	no data	119.6	124.0	115.4	108.0	106.8
GCGW	112.7	126.0	126.1	116.9	114.8	111.5
CHJ	no data	124.9	127.0	117.6	114.0	111.0
CHQW	no data	130.1	134.4	116.8	113.6	109.3
WEL	115.8	123.1	124.6	114.7	112.4	109.3
RRH	109.9	124.0	129.0	114.5	109.4	105.0
RRDW	no data	no data	129.7	117.6	113.8	108.8
RIS	109.3	122.8	126.4	112.7	109.6	103.9
RIGW	no data	no data	130.7	119.8	114.5	108.3
WAN	111.8	125.2	128.5	115.9	113.1	107.0
WANW	113.4	129.5	133.8	119.1	111.0	104.5
PRD	114.1	128.6	131.9	119.9	113.1	106.4
PRXW	113.1	126.1	128.4	119.9	113.7	no data
DWQI	109.5	112.0	107.0	111.4	113.4	105.8
PEKI	103.9	105.3	103.2	106.7	106.3	*
LEWI	103.1	104.4	102.4	105.2	105.4	*
LWG	105.7	107.5	108.0	106.2	105.5	100.1
LGNW	112.8	121.5	122.3	106.0	103.9	101.2
LGS	109.3	116.0	117.5	103.6	103.5	100.7
LGSW	118.2	126.6	126.8	104.7	104.4	no data
LMN	115.3	123.7	121.6	103.5	102.0	99.2
LMNW	118.8	127.7	124.9	102.5	101.5	100.6
IHR	114.5	122.3	121.3	103.5	101.3	101.3
IDSW	121.5	128.3	127.5	117.9	117.5	102.9
MCQO	111.5	120.8	121.0	112.4	109.1	104.1
MCQW	110.6	119.1	119.9	113.6	109.0	104.1
MCPW	120.1	128.7	130.6	117.3	112.9	103.9
JDA	111.9	122.4	122.3	111.3	106.0	103.1
JHAW	121.8	137.6	136.3	115.4	112.9	103.5
TDA	113.0	124.3	125.6	109.9	107.0	102.9
TDDO	113.9	124.8	126.2	118.2	116.0	102.0
BON	114.0	124.2	124.3	114.2	112.0	103.8
WRNO	118.0	129.0	132.0	116.7	115.3	104.1
SKAW	116.0	127.5	130.9	116.0	118.9	104.0
CWMW	115.7	126.9	129.4	114.6	116.1	102.6
KLAW	113.4	123.3	126.1	112.9	112.1	104.5
WANO	111.1	119.3	121.3	109.3	107.3	103.9

(*) sensors not adequately submerged

Table 4: Historic Maximum Observed TDG (%), 1984-1997

Station	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984
CIBW	134.0	136.3	127.9	122.2	125.3	137.9	137.4	124.6	124.6	123.5	123.1	134.2	123.6	125.6
FDRW	128.1													
GCGW	137.7	143.0	116.1	110.7	140.3	116.4	129.5	119.9	120.5	110.7	114.3	139.2	114.9	113.1
CHJ	136.7	132.6	114.2	110.0	132.9	115.9	125.2	120.2	117.0	112.7	115.1	118.4	116.5	114.7
CHQW	144.5													
WEL	132.4	131.1	114.0	113.0	120.0	117.9	118.5	119.5	116.1	111.6	114.2	125.7	115.5	118.1
RRH	133.6	125.7	111.0	117.4	124.7	113.6	122.0	132.3	113.3	110.8	115.3	123.4	114.2	112.8
RRDW	136.7													
RIS	133.4	129.4	113.2	114.8	129.6	115.0	124.1	131.2	114.8	111.6	117.2	118.1	113.6	112.0
RIGW	138.5													
WAN	135.4	129.0	117.5	118.3	121.0									
WANW	139.1	138.2	125.8	128.0										
PRD	136.9	135.8	128.5	133.1	135.7		124.6	133.0	121.6	126.8	122.7	128.4	123.0	128.3
PRXW	132.1	130.3	121.5	128.4	148.4									
DWQI	122.7	122.3	124.1	122.4										
PEKI	112.8	120.5												
LEWI	112.7													

Table 5: Timing of Maximum Observed % TDG

Station	Max (%)	Date of Maximum % TDG
CIBW	134.0	22-May
FDRW	128.1	10-Jun
GCGW	137.7	5-Jun
CHJ	136.7	7-Jun
CHQW	144.5	12-Jun
WEL	132.4	2-May
RRH	133.6	20-Jun
RRDW	136.7	15-Jun
RIS	133.4	12-Jun
RIGW	138.5	15-Jun
WAN	135.4	13-Jun
WANW	139.1	17-Jun
PRD	136.9	15-Jun
PRXW	132.1	12-Jun
DWQI	122.7	23-Apr
PEKI	112.8	16-Jul
LEWI	112.7	3-Aug
LWG	115.1	5-Aug
LGNW	138.8	14-May
LGS	129.8	10-Jun
LGSW	148.9	29-May
LMN	134.8	22-May
LMNW	137.4	31-May
IHR	129.2	19-May
IDSW	133.1	17-May
MCQO	127.4	9-Jun
MCQW	125.3	13-Jun
MCPW	141.3	6-Jun
JDA	132.8	10-Jun
JHAW	145.1	24-Apr
TDA	135.5	10-Jun
TDOD	133.3	10-Jun
BON	130.6	10-Jun
WRNO	143.0	6-Jun
SKAW	143.5	15-Jun
CWMW	140.2	9-Jun
KLAW	132.8	12-Jun
WANO	127.5	17-Jun

Table 6: 1997 Monthly Average Water Temperatures (Celcius)

Station	APR	MAY	JUN	JUL	AUG	SEP
CIBW	5.8	9.1	12.9	15.7	17.9	17.2
FDRW	no data	9.7	12.7	17.3	21.3	19.7
GCGW	6.3	10.6				

TABLE 7: Historic Maximum Observed Temperatures (Celcius)

Station	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984
CIBW	19.6	18.4	21.1	23	24.8	22.8	21.6	17.6	19.1	18.7		24.1	22.1	20.3
FDRW	23.9													
GCGW	21.4	19.9	20.3	20.6	19.8	21.4	22	19.7	19.4	17.9	18.6	18.4		
CHJ	20	19	20.2	19.4	19.3	19.9	19.5	19.9	19.4	19.3	20.3	18.2	24.7	23
CHQW	16.4													
WEL	19.8	18.8	20.2	20.1	19.8	19.7	19.6	20	20					22.3
RRH	18.8	19	19.9	13.5		19.4		21	20.2				26.5	22.3
RRDW	19.5													
RIS	19.6	19.1	19.7	19.4		18.8	21.8	23.8	21.3		18.2	17.8		
RIGW	19.6													
WAN	21.7	22	22.8	25.3										
WANW	20.3	19.8	21.2	21.9										
PRD	21	20.2	22.9	22	23		21.6	22.9	22.5	21.2	20.1	19.6	25	24.9
PRXW	23.5	18.7	21.7	25.2										
DWQI	16.6	14.3	15.2	12.7										
PEKI	15	18.3												
LEWI	17	18.3												
LWG	23	23	23.2	25	22.3	25.8	25.8	26.5	21.7	24.4	23.5	24.8	25.5	22.9
LGNW	20.8	21.5	20.9											
LGS	21.5	26	24.5	25.4	24.9	25.4		26.9	24.7	25.5	25.9	25.8	19.9	18.5
LGSW	21.4	22.4	22											
LMN	21.3	24.1	26.6	23.2	24.5	25.8	25.9	25	24.3	24.8	24.8	19.1	18.5	
LMNW	21.1	22.2	22.2											
IHR	21.7	23.3	23.7	25.5	23.3	25.3		26.7	25.4	23.1	24.8	26.7		18.2
HPKW			23.9	21.7										
IDSW	21.5	22.3	22.3	23										
MCQO	21.3	25.6	26.7	25.4	25.8	25.9	25.8	23.8	23.4	24.5	23.4	24.7	19.9	
MCQW	21.3	22.2	24.8	24.7	26.7	25.8	24.9	23.9	24.1	23.9	25.2	23		
MCPW	21.3	21.1	22.2											
JDA	22.9	22.3	24.4	24.7	23.3	25.9	24.8	25.2	22.3	23.7	25	22.8		
JHAW	23	21.5	22.3											
TDA	22.2	21.1	24.3	24.3		23.6	26.3	24.2	21.7	23.4	23.6	23.3	22.7	19.3
TDTO			18.9	22.5										
TDDO	22.4	22												
BON	23.9	21.8	23.3	25.4	21.7	22.8	22.7	23.2	25.4	22.2	22.2	23.2	21.8	20.3
WRNO	22.6	21.6	22.2	22.7	21.9	22.8	23.3	23.2	21.5	22	22	22.8	25	23.4
SKAW	23.2	21.3	25.8	23.3										
CWMW	22.8	23	30.1	24.2	23									
KLAW	22.9	22.4	24.8	24.8	22.7									
WANO	24.6	22.3	22.9	23.7	22									

Table 8: Timing of 1997 Maximum and Minimum Water Temperatures

Station	Maximum	Date of Maximum	Minimum (Celcius)	Date of Minimum
CIBW	19.6	15-Aug	5	11-Apr
FDRW*	23.9	6-Aug	7.7	11-May
GCGW	21.4	18-Aug	4.8	1-Apr
CHJ	20	31-Aug	8	6-May
CHQW	16.4	31-Aug	7.2	4-May
WEL	19.8	1-Sep	5.9	12-Apr
RRH	18.8	10-Sep	3.5	2-Apr
RRDW*	19.5	3-Sep	12.3	13-Jun
RIS	19.6	4-Sep	5.4	1-Apr
RIGW*	19.6	4-Sep	12.2	14-Jun
WAN	21.7	12-Aug	4.7	2-Apr
WANW	20.3	1-Sep	4.8	2-Apr
PRD	21	30-Aug	4.7	1-Apr
PRXW	23.5	2-Sep	4.9	2-Apr
DWQI	16.6	5-Sep	3.8	1-Apr
PEKI*	15	17-Aug	4	2-Apr
LEWI*	17	15-Aug	4.2	2-Apr
LWG	23	9-Sep	7.3	4-Apr
LGNW	20.8	1-Sep	7.5	1-Apr
LGS	21.5	8-Sep	7.7	1-Apr
LGSW	21.4	9-Sep	8.2	1-Apr
LMN	21.3	5-Aug/1-Sep	8.2	22-Apr
LMNW	21.1	4-Sep	8.5	1-Apr
IHR	21.7	4-Aug/1-Sep	8	1-Apr
IDSW	21.5	7-Aug	8.1	1-Apr
MCQO	21.3	7-Aug/1-Sep	6.5	1-Apr
MCQW	21.3	9-Aug	6.2	1-Apr
MCPW	21.3	9-Aug	6.2	1-Apr
JDA	22.9	16-Aug	7	1-Apr
JHAW	23	10-Aug	6.7	2-Apr
TDA	22.2	22-Aug	5.5	6-Apr
TDDO	22.4	11-Aug	7.1	1-Apr
BON	23.9	26-Aug	7.2	4-Apr
WRNO	22.6	13-Aug	7.6	3-Apr
SKAW	23.2	13-Aug	7.1	2-Apr
CWMW	22.8	17-Aug	6.9	4-Apr
KLAW	22.9	15-Aug	7.7	1-Apr
WANO	24.6	16-Aug	8.1	11-Apr

Table 9: Winter and Spill Season Periods of Record for Data Sets

STATION CODE	STATION NAME	START DATE	END DATE
CIBW*	US/Can Boundary	since Sept 96	on-going
FDRW	GCL Forebay	1-May	15-Oct
GCGW	GCL Tailwater	5-Feb	**
LIBM	LIB Tailwater	during spill only	during spill only
CHJ	CHJ Forebay	5-May	**
CHQW	CHJ Tailwater	5-May	15-Sep
WEL	WEL Forebay	11-Apr	2-Sep
RRH	RRH Forebay	2-Apr	30-Sep
RRDW	RRH Tailwater	14-Jun	30-Sep
RIS	RIS Forebay	2-Apr	30-Sep
RIGW	RIS Tailwater	14-Jun	30-Sep
WAN	WAN Forebay	13-Mar	**
WANW	WAN Tailwater	21-Mar	**
PRD	PRD Forebay	21-Mar	**
PRXW	PRD Tailwater	19-Mar	31-Aug
DWQI*	DWR Tailwater	since Dec96	on-going
PEKI	Peck	18-Feb	15-Sep
LEWI	Lewiston	22-Mar	15-Sep
LWG*	LWG Forebay	since Jan97	on-going
LGNW*	LGNW TW	since Jan 97	1-Sep
LGS	LGS Forebay	since Jan 97	13-Sep
LGSW	LGS Tailwater	since Jan97	15-Sep
LMN	LMN Forebay	since Jan 97	** intermittent
LMNW	LMN Tailwater	since Jan 97	** intermittent
IHR*	IHR Forebay	since Jan 97	On-going
IDSW*	IHR Tailwater	since Jan 97	On-going
MCQW*	MCN FB/Wa	since Dec96	On-going
MCQO*	MCN FB/Or	since Dec96	On-going
MCPW*	MCN Tailwater	since Dec96	On-going
JDA	JDA Forebay	25-Mar	16-Sep
JHAW	JDA Tailwater	25-Mar	17-Sep
TDA	TDA Forebay	25-Mar	17-Sep
TDDO	TDA Tailwater	25-Mar	17-Sep
BON*	BON Forebay	since Dec96	On-going
WRNO*	Warrendale	since Dec96	On-going
SKAW	Skamania	since Dec96	18-Sep
CWMW	Camas	since Dec96	19-Sep
KLAW	Kalama	since Dec96	19-Sep
WANO	Wauna Mill	since Dec 96	19-Sep

(*) winter monitoring stations

(**) station in service over winter; little or no calibration occurring

Table 10: Data Correction Criteria and Final Data Set**April 1 - September 15, 1997**

Station	TDG Pressure	Barometric Pressure	Temperature	Total Data Set
CIBW	86.68	86.93	80.53	86.80
FDRW	80.98	79.99	59.55	73.50
GCGW	95.93	99.33	73.61	89.62
CHJ	72.79	72.97	72.97	72.91
CHQW	79.41	79.09	79.51	79.34
WEL	79.56	80.26	72.32	77.38
RRH	87.34	90.39	83.96	87.23
RRDW	61.5	BP comes from RRH	65.5	63.5
RIS	89.4	89.5	89.5	89.5
RIGW	76.4	BP comes from RIS	76.4	76.4
WAN	98.09	97.45	72.81	89.49
WANW	98.49	98.64	98.56	98.61
PRD	99.31	99.65	94.08	97.73
PRXW	84.43	95.66	87.33	89.19
DWQI	98.00	99.90	96.10	98.00
PEKI	91.05	98.36	87.70	92.40
LEWI	84.33	99.21	87.35	90.29
LWG	99.23	99.33	92.04	96.87
LGNW	88.29	88.62	87.40	88.10
LGS	84.77	98.51	83.31	88.86
LGSW	74.85	94.92	76.29	82.02
LMN	93.35	99.78	85.27	92.80
LMNW	90.90	99.85	96.70	95.82
IHR	94.79	99.95	91.84	95.53
IDSW	99.13	99.21	99.21	99.18
MCQW	98.41	98.49	93.40	96.77
MCQO	97.89	98.34	79.39	91.87
MCPW	96.06	96.21	96.21	96.16
JDA	95.78	95.81	89.98	93.86
JHAW	90.18	90.53	82.51	87.74
TDA	91.99	91.89	91.77	91.88
TDDO	98.56	99.65	99.50	99.24
BON	99.83	98.31	97.35	98.50
WRNO	99.78	99.78	99.13	99.56
SKAW	99.06	99.13	95.31	97.83
CWMW	95.78	95.63	80.48	90.63
KLAW	98.83	98.78	98.34	98.65
WANO	99.93	99.98	99.21	99.70

CRITERIA USED TO FLAG DATA AND DETERMINE WHETHER VALID:

Temperature Upper Limit: 75 Degrees Fahrenheit

Temperature Lower Limit: 38 Degrees Fahrenheit

Temperature Bounce (between hourly values): 1 degree Fahrenheit

Barometric Pressure Upper Limit: 800 mm Hg

Barometric Pressure Lower Limit: 700 mm Hg

Barometric Pressure Bounce (between hourly values): 4 mm Hg

TDG Upper Limit: 1100 mm Hg

TDG Upper Limit: 700 mm Hg

TDG Bounce (between hourly values): 50 mm Hg

These limits were used to flag problem values/areas. No deletions were made until the data was reviewed manually.

Table 11: Station Performance**April 1- September 15, 1997**

Station	% of Total Data Set in CROHMS	Owner
WANO	99.70	COE-NWP/USGS
WRNO	99.56	COE-NWP/USGS
TDDO	99.24	COE-NWP/USGS
IDSW	99.18	COE-NWW
KLAW	98.65	COE-NWP/USGS
WANW	98.61	Grant Co PUD
BON	98.50	COE-NWP/USGS
DWQI	98.00	COE-NWW
SKAW	97.83	COE-NWP/USGS
PRD	97.73	Grant Co PUD
LWG	96.87	COE-NWW
MCQW	96.77	COE-NWW
MCPW	96.16	COE-NWW
LMNW	95.82	COE-NWW
IHR	95.53	COE-NWW
JDA	93.86	COE-NWP/USGS
LMN	92.80	COE-NWW
PEKI	92.40	COE-NWW
TDA	91.88	COE-NWP/USGS
MCQO	91.87	COE-NWW
CWMW	90.63	COE-NWP/USGS
LEWI	90.29	COE-NWW
GCGW	89.62	BOR/CSI
RIS	89.5	Chelan Co PUD
WAN	89.49	Grant Co PUD
PRXW	89.19	Grant Co PUD
LGS	88.86	COE-NWW
LGNW	88.10	COE-NWW
JHAW	87.74	COE-NWP/USGS
RRH	87.23	Chelan Co PUD
CIBW	86.80	BOR/CSI
LGSW	82.02	COE-NWW
CHQW	79.34	COE-NWS/CSI
WEL	77.38	Douglas Co PUD
RIGW	76.4	Chelan Co PUD
FDRW	73.50	BOR/CSI
CHJ	72.91	COE-NWS/CSI
RRDW	63.5	Chelan Co PUD

Table 12: Comparison of 1995-1997 Total Dissolved Gas Data Sets after Final Corrections

This table does not directly estimate the timeliness of the TDG data.

Instead, we can see that the completeness of the final dataset has increased since 1995.

Judging from the percent of TDG data received at the RCC in 1995,

87.1% of the data-set remained after final corrections;

in 1996, 89.6% of the data-set remained after corrections; and 93.4% of the data-set remained after corrections in 1997. This is a function of a few factors:

1) more time, energy and money has been placed on the TDG monitoring effort in the last few years.

Response time to equipment problems has hastened, and data quality has subsequently improved.

If data is missing from the Corps of Engineers Water Management homepage or CAFÉ reports, we receive calls from outside users more than in the past.

Additionally, TMT pays more attention to the data, impressing upon program managers the need for real-time data reliability.

2) Data is more thoroughly reviewed as it arrives to the CROHMS data-base and at the end of the season. If transmission does not occur to CROHMS, efforts are made to fill the gaps. And, data is retained in the data-set whenever possible after thorough review.

Station	1997	NOTES	1996	NOTES	1995	NOTES
CHJ	72.91	¹	95.1		86	
CHQW		²				
DWQI	98.00		84.9	⁴	86.7	
PEKI	92.40					
LEWI	90.29					
LWG	96.87		89.1		99.6	
LGNW	88.10		91.6		79.2	
LGS	88.86		94.9		75	
LGSW	82.02		89.7		94.1	
LMN	92.80		92.7		71.6	
LMNW	95.82		88.4			
IHR	95.53		86.5	⁵	92.4	
IDSW	99.18		82.6	⁶	83.8	
MCQW	96.77		94		95.5	
MCQO	91.87		93		92.3	
MCPW	96.16		93.5		82.8	
JDA	93.86		99.90		78.7	
JHAW	87.74	³	94.20		87.2	
TDA	91.88		86.30	⁷	95.6	
TDDO	99.24					
BON	98.50		99.80		71.9	
WRNO	99.56		95.80		88.3	

SKAW	97.83		73.00	8	84.4	
CWMW	90.63		97.90			
KLAW	98.65		59.00	9	99.9	
WANO	99.70		86.60	10	96	
SEASON AVERAGE	93.41		89.61		87.1	

1. Late start-up
2. New station 1997
3. Station damaged in February flood
4. Station equipment and transmission problems
5. Station equipment and transmission problems
6. Station equipment and transmission problems
7. Station equipment and transmission problems
8. Station damaged in February flood
9. Station damaged in Feruary flood
10. Station equipment problems

Note: In 1996, the USGS provided the COE with a "final data set," that was more complete than the 1996 statistics above show. The reason it was bigger is that USGS carefully
"

Table13: 1997 Percentage of Real-Time Data Transmission
April 1 - September 15, 1997

Station	Real-time 1997
CHJ	74.90
CHQW	*
DWQI	97.60
PEKI	95.20
LEWI	86.20
LWG	97.60
LGNW	84.40
LGS	97.00
LGSW	94.60
LMN	95.20
LMNW	95.20
IHR	98.80
IDSW	98.80
MCQW	91.60
MCQO	91.60
MCPW	88.60
JDA	97.00
JHAW	77.80
TDA	94.00
TDDO	100.00
BON	100.00
WRNO	100.00
SKAW	100.00
CWMW	100.00
KLAW	100.00
WANO	100.00
SEASON AVERAGE	94.24

* CHQW did not transmit realtime in 1997.

Based on improvements to timeliness and completeness of the TDG data,
we conclude that the quality of the data has improved over the last few years.

We know that 94.2% of the 1997 data arrived within 24 hours of occurrence
and we estimate that the percentage of real-time data for 1995 and 1996 was less than
this.

Table 14: Percentage of Season Total Dissolved Gas Saturation Exceeded 115/120% or 125% between April 10-August 31, 1997

Station	TDG % Standard	% of Season	% of Season	% of Season	Note
		Average of 12 highest hrs in one calendar day exceeds 115/120% TDG	Highest hour in one calendar day	Highest two hrs in one calendar day	
			125% TDG or more	125% TDG or more	
CIBW	120	82.5	53.8	51.7	
FDRW	115	61.5	12.3	9.1	1
GCGW	120	39.9	37.1	36.4	
CHJ	115	61.5	24.5	24.5	
CHQW	120	48.7	49.6	40.6	2
WEL	115	58.7	28	22.4	3
RRH	115	55.7	36.5	32.2	4
RRDW	120				5
RIS	115	51.3	33	25.9	6
RIGW	120				7
WAN	115	65	33.6	32.9	
WANW	120	51	47.6	47.6	
PRD	115	75.5	49	49	
PRXW	120	57.3	40.6	40.6	
DWQI	120	16.1	0	0	
PEKI	120	0	0	0	
LEWI	120	0	0	0	
LWG	115	0	0	0	
LGNW	120	28.7	28	26.6	
LGS	115	25.9	7.7	7.7	
LGSW	120	43.4	45.5	44.1	
LMN	115	51	32.2	30.1	
LMNW	120	45.5	46.9	46.2	
IHR	115	50.3	16.8	16.8	
IDSW	120	51.7	47.6	47.6	
MCQW	115	51.7	0.7	0	
MCQO	115	48.3	4.2	2.8	
MCPW	120	46.9	43.4	43.4	
JDA	115	46.2	17.5	14.7	
JHAW	120	47.6	49.7	48.3	
TDA	115	47.6	31.5	30.1	
TDDO	120	46.9	31.5	30.8	
BON	115	55.9	26.6	25.9	
WRNO	120	49	45.5	45.5	
SKAW	120	54.5	43.4	42.7	
CWMW	115	69.2	41.3	41.3	
KLAW	115	51.7	24.5	23.8	
WANO	115	44.8	4.9	4.2	
AVE		46.7	28.8	27.4	

Notes

- 1 Starting May 1
- 2 Starting May 4
- 3 Based on only 6 readings per 24 hours
- 4 Starting May 9
- 5 Did not calculate because station was new in June
- 6 Starting May 9
- 7 Did not calculate because station was new in June

**Summary of Total Dissolved Gas Standards as per Oregon Department
Environmental Quality (DEQ) and Washington Department of Ecology (DOE)
April 10-August 31, 1997**

DOE

TDG shall not exceed an average of 115% as measured at Camas/Washougal below Bonneville Dam or as measured in the forebays of the next downstream dam for all other dams.

Total dissolved gas shall also not exceed an average of 120% as measured in the tailraces of each dam. These averages are based on the 12 highest hourly readings in any one day of TDG.

In addition, there is a maximum TDG one hour average of 125%.

DEQ

A TDG standard for the Columbia River of a daily (12 highest hours) average of 115% as measured at established monitors at the forebay of the next dam downstream from the spilling dam.

A daily (12 highest hours) average of 120% as measured at established tailrace monitors below the spilling dams during these times.

A cap on TDG of 125%, based on the highest two hours during the 12 highest hourly measurements per calendar day.

Table 15: List of Contact Persons

Project	Name	Position	Phone #	E-Mail/Fax
Internal Boundary Grand Coulee	Dave Zimmer	Biologist/Coordinator	(208) 378-5088	(208) 378-5066 dzimmer@pn.usbr.gov
	Norbert Cannon	Limnologist/Oversight	(208) 334-1540	(208) 334-1858
	Jim Doty	Engineer/Transmission	(208)378-5272	
Chief Joseph Libby	Marian Valentine	Hydraulic Engineer/Coordinator	(206) 764-3543	(206)764-6678 marian.valentine@usace.army.mil
	Ray Strode	Meteorological Tech/Oversight	(206) 764-3529	(206)764-6678 i.ray.strode@sace.army.mil
Wells (Douglas)	Rick Klinge	Biologist/Oversight	(509) 884-7191	884-0553 rklinge@dcpu.d.org
Rocky Reach Rock Island (Chelan)	Robert MacDonald	Biologist/Oversight	(509) 663-8121	664-2898 robertmc@chelanpud.org
Wanapum Priest Rapids (Grant)	Chris Carlson	Biologist/Oversight	(509) 754-3541	754-5095 ccarls@gcpud.org
	Dee Chandler	Grant/Transmission	(509) 754-3541	
Dworshak Lower Granite Little Goose Lower Monumental Ice Harbor McNary	Teri Barila	Fishery Biologist/Coordinator	(509) 527-7275	
	Lisa Patton	Technician/Oversight and Repair	(509)527-7544	
	Jesse Smiley	Chief of Ops (LWG)	(509) 843-1493	
	Ray Eakin	Chief of Ops (LGS)	(509) 399-2233	
John Day The Dalles Bonneville Warrendale Skamania Camas/Washougal Kalama and Wauna Mills	Jim Britton	Biologist/Oversight	(503)808-4888	
	Faith Ruffing	Contractor		
	Jim Williams	Project Supt (TDA/JDA)	(541) 298-7502	
	Darrell Hunt	Chief of Ops (BON)	(541) 374-8338	
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	Dwight Tanner	USGS	(503) 251 3289	
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